RTI in Elementary Math

2011 Title 1 Conference

Ann Verploegen

RTI in Elementary Math

Acknowledgements

RTI in Elementary Math

- Math Essential Components
- RTI Essential Components
- Promising Practices

Essential Components

- Our students
- Our curriculum
- Our teaching
- Our colleagues
- Our own education and training

Essential Components

- Your district or local curriculum
- Your regional opportunities for training
- Developments at the State level
- Developments at the National Level
- Common Core Standards

Math Essential Components

What are the pre-requisite skills which children need in order to successfully learn mathematics?

1. Follow sequential directions
2. Recognize patterns
3. Estimate by forming a reasonable guess about quantity, size, etc.
4. Visualize pictures and manipulate them
5. Have a good sense of spatial organization and organization
6. Apply deductive reasoning.
7. Apply inductive reasoning
8. Understand the language of mathematics

Visualize pictures and manipulate them…… the RTI triangle.

Math Essential Components

- Research shows that several measures are reliable in detecting and predicting how well young students are mastering number manipulation and basic arithmetic.
- Digit Span
- Magnitude Comparison
- Missing Number
- Number Sense
- Numbers from Dictation
- Number Identification
- Quantity Discrimination

Math Essential Components

Number Sense

Just as phonemic awareness is a pre-requisite to learning phonics and becoming a successful reader, developing number sense is a pre-requisite for succeeding in mathematics

Math Essential Components

- What do we know about how children develop mathematical understanding?

Learning trajectories

Learning trajectory for recognizing patterns.

Math Essential Components

- Developmental Levels for Patterning and Early Algebra (Sharon Griffin)

2 Pre-Patterner
3 Pattern Recognizer
3-4 Pattern Duplicator AB
4 Pattern Extender AB
5 Pattern Duplicator
5 Pattern Extender
7 Pattern Unit Recognizer

Math Essential Components

How does this relate to how we teach?

Instructional Strategies

a) Effect sizes
b) Cognitive Strategy
   Concrete, Representational, Abstract

Effect Sizes

Strategy	For Low Achieving Students	For Special Education Students
Systematic and Explicit Instruction	0.58 Moderate to large	1.19 Large

Effect Sizes

Strategy	For Low Achieving Students	For Special Education Students
Student Think Alouds	NA	0.98 Large
Visual and graphic depictions of problems	NA	0.50

Effect sizes

Strategy	Low Achieving Students	Special Education Students
Structured peer assisted learning activities	0.62 Large	0.42 Moderate
Formative assessment data to staff	0.51 Moderate	0.32 Small

CRA Approach

- CRA or sometimes called CPA
- Builds on the work of Bruner

C = concrete components
R = representational / P – pictorial
A = abstract

Review

- Math Essential Components
- RTI Essential Components

RTI and Math
8 Essential Components

1. Evidence Based Curriculum and Instruction

What does "evidence based" mean as applied to:

a) Curriculum – previous research and alignment with standards

a) Instruction – Effect sizes and CRA

The Core Academic Curriculum
Tiered support for Instruction
Effective Instructional Practices
Where does Title 1 work fit?

2. On going assessment

- Benchmarking or screening
- Progress monitoring
- Diagnostic assessment
- Outcome assessment

3. Collaborative Teaming

Characteristics of Effective Collaborative Teams

Results
Accountable
Commitment
Conflict Capable
Trust

3 Collaborative Teaming

- At the School level:

- At the student level:

4. Data Based Decision Making

- Once we have data being collected consistently and managed effectively we look to two levels of decision making:

- RTI Leadership/Steering Team
- RTI Student Problem solving Team

5. Fidelity of Implementation

Fidelity in RTI in terms of:

- Curriculum
- Instruction
- Assessment
- Collaborative Team Problem Solving Process
- RTI Process – time, frequency
- Built in fidelity checks - examples

6. On going training and professional development.

Training on what?

- RTI Philosophy and Process
- Core and Intervention programs
- Assessment Systems
- Effective instructional Practices
- Data Management
- Interpreting data

7. Community and family Involvement

- Presenting new ways of working to parents and the community
- Parent involvement on Leadership Team
- Making sure your data matches your report card.
- Making sure your data makes sense – an aim line is worth a thousand words

8. Strong Leadership

- Administrative Leadership
- Instructional Leadership
- Policy and regulatory changes
- Strategic planning
- Arranges Staff development
- Assesses procedural fidelity

We're doing RTI Math – or are we?

a) How long does it take?
b) What needs to be taken into account?
c) RTI process for L.D.
   - Evidence of the 8 essentials in use
   - Board Approval
   - Program Narrative
   - System approval

Levels of Implementation

Self assessment tool for 2011/12

- Exploring
  - Finding out
  - Setting up the system
- Implementing
  - Basics in place
  - Reaching beyond the basics
- Sustaining

RTI in Elementary Math

Promising practices

- Data management systems
- Supplementary programs
- Options for Benchmarking and Progress Monitoring
- New ways of assessing students

David Tilley's Top 10 Ways to Succeed with RTI (2005)

10. Start small – don't over commit
9. Invest the resources to know what you are doing.
8. Be supportive of failure – no one fails alone.
7. Promote it, don't sell it.
6. Let innovation spread naturally.
5. Change how you think.

David Tilley's Top 10 Ways to Succeed with RTI

4. Be in for the long haul, not the short term
3. Give away credit – do it as a team, not as an individual
2. Support knowledgeable leaders
1. Work smarter – not harder.

Ann's top 7 for Title Staff to Succeed in RTI Math work

7. Collaborate, collaborate, collaborate.
6. Know where your teaching fits in the big picture of student progress.
- Participate in training at your school and in your region.
4. Learn the language of RTI.
3. Ask good questions which will help your instruction be more effective.
2. Be well organized and bring your data to your problem solving meetings.
1. Speak up – your observations are so valuable.

RTI in Elementary Math

Selected references.

Ann Verpoloegen
redmule2@juno.com